FORM PTO-1449 (REV. 7-85)
U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE CITATION

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ATTY. DOCKET NO. 1-32411A
APPLICATION NO. 10/509,009
APPLICANT CHIQUET-EHRISMANN ET AL.
FILING DATE SEPTEMBER 24, 2004
Group

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE
AG	AA	6,124,260		Sharifi, et al.			
	AB						
	AC						
	AD						
	AE						
	AF						
	AG						
	AH						
	AI						
	AJ						
	AK						
	AL						

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	OFFICE	CLASS	SUBCLASS	TRANSLATION YES	NO
AG	AM	WO 9421293		PCT			☐	☐
AG	AN	WO 9204464		PCT			☐	☐
	AO						☐	☐
	AP						☐	☐
	AQ						☐	☐

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent pages, Etc.)

AG	AR	Arakawa, et al. "Mus Musculus 16 Days Embryo Head cDNA", Database EMBL Online; Accession No. BB648643 - XP002250801 (2001)*
AG	AS	Zhao, et al. "RPCI-24-112D17.TV RPCI-24 Mus Musculus Genomic Clone RPCI-24-112D17", Database EMBL Online, Accession No. AZ748340 XP002250802 (2001) *
AG	AT	Rhodes, S., "Novel Human MRNA from Chromosome 1, Similar to Tenanscin-R", Database EMBL Online, Accession No. AL049689 (1999) *

EXAMINER	DATE CONSIDERED
/Anne Gussow/	02/02/2007

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Sheet 2

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AG	DA	Abe, et al., "Purification of Primordial Germ Cells from TNAP Bgeo Mouse Embryos Using FACS-gal", Develop. Biol., Vol. 180, pp. 468-72 (1996)
	DB	Akamatsu, et al., "Suppression of Transformed Phenotypes of Human Fibrosarcoma Cells by Overexpresion of Recombinant Fibronectin", Cancer Res., Vol. 56, pp. 4541-46 (1996)
	DC	Bloom, et al., "Fibronectin Regulates Assembly of Actin Filaments and Focal Contacts in Cultured Cells Via the Heparin-binding Site in Repeat III 13", Mol. Biol. of the Cell, Vol. 10, pp. 1521-36 (1999)
	DD	Boudreau, et al., "Extracellular Matrix Signaling: Integration of Form and Function in Normal and Malignant Cells", Current Opin. in Cell Biol., Vol. 10, pp. 640-46 (1998)
	DE	Bourdon, et al., "Human Glioma-mesenchymal Extracellular Matrix Antigen Defined by Monoclonal Antibody", Cancer Res., Vol. 43, pp. 2796-2805 (1983)
	DF	Burch, et al., "Tenascin-X Deficiency Is Associated with Ehlers-Danlos Syndrome", Nature Gen., Vol. 17, pp. 104-8 (1997)
	DG	Chiquet, et al., "Chick Myotendinous Antigen II. A Novel Extracellular Glycoprotein Complex Consisting of Large Disulfide-linked Subunits", J. of Cell Biol., Vol. 98, pp. 1937-46 (1984)
	DH	Chiquet, et al., "Chick Myotendinous Antigen I. A Monoclonal Antibody as a Marker for Tendon and Muscle Morphogenesis", J. of Cell Biol., Vol. 98, pp. 1926-36 (1984)
	DI	Chiquet-Ehrismann, "Tenascins, A Growing Family of Extracellular Matrix Proteins", Experienta, Vol. 51, pp. 853-62 (1995)
	DJ	Chiquet-Ehrismann, "Tenascin and Other Adhesion-modulating Proteins in Cancer", Cancer Biol., Vol. 4, pp. 301-10 (1993)
	DK	Chiquet-Ehrismann, et al. "Tenascin: An Extracellular Matrix Protein Involved in Tissue Interactions During Fetal Development and Oncogenesis", Cell, Vol. 47, pp. 131-39 (1986)
	DL	Chiquet-Ehrismann, et al., "Tenascin Interferes with Fibronectin Action", Cell, Vol. 53, pp. 383-90 (1988)
	DM	Denda, et al. "Utilization of a Soluble Integrin-alkaline Phosphatase Chimera to Characterize Integrin a8/B1 Receptor Interactions with Tenasin: Murine a8/B1 Binds to the RGD Site in Tenascin-C Fragments, but Not to Native Tenascin-C, Biochem., Vol. 37, pp. 5464-74 (1998)
AG	DN	Erickson, et al., "A Six-armed Oligomer Isolated from Cell Surface Fibronectin Preparations", Nature, Vol. 311, pp. 267-69 (1984)

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AG	DA	Huse, et al., "Generation of a Large Combinatorial Library of the Immunoglobulin Repertoire in Phage Lambda", Science, Vol. 246, pp. 1275-81 (1989)
	DB	Kohfeldt, et al., "Properties of the Extracellular Calcium Binding Module of the Proteoglycan Testican", FEBS, Vol. 414, pp. 557-61 (1997)
	DC	Kohler, et al., "Continuous Cultures of Fused Cells Secreting Antibody of Predefined Specificity", Nature, Vol. 256, pp. 495-97 (1975)
	DD	Koyama, et al., "Expression of Syndecan-3 and Tenascin-C: Possible Involvement in Periosteum Development", J. of Ortho. Res., Vol. 14, pp. 403-12 (1996)
	DE	Latijnhouwers, et al., "Tenascin Expression During Wound Healing in Human Skin", J. of Path., Vol. 178, pp. 30-35 (1996)
	DF	Li, et al., "Expression of Stromelysin-1 and TIMP-1 in the Involuting Mammary Gland and in Early Invasive Tumors of Mouse", Int. J. Cancer, Vol. 59, pp. 560-68 (1994)
	DG	Munarini, et al., "Altered Mammary Epithelial Development, Pattern Formation and Involution in Transgenic Mice Expressing the EphB4 Receptor Tyrosine Kinase", J. of Cell Science, Vol. 115, pp. 25-37 (2002)
	DH	Giancotti, et al. "Elevated Levels of the a5B1 Fibronectin Receptor Suppress the Transformed Phenotype of Chinese Hamster Ovary Cells", Cell, Vol. 60, pp. 849-59 (1990)
	DI	Hagios, et al., "Tenascin-Y: A Protein of Novel Domain Structure Is Secreted by Differentiated Fibroblasts of Muscle Connective Tissue", J. of Cell Biol., Vol. 134, pp. 1499-1512 (1996)
	DJ	Hall, et al., "Divid, Accumulate, Differentiate: Cell Condensation in Skeletal Development Revisited", Int. J. Dev. Biol., Vol. 39, pp. 881-93 (1995)
	DK	Ward, et al., "Binding Activities of a Repertoire of Single Immunoglobulin Variable Domains Secreted from Escherichia Coli", Nature, Vol. 341, pp. 544-46 (1989)
	DL	Weber, et al., "Zebrafish Tenascin-W, a New Member of the Tenascin Family", Swiss Fed. Inst. Of Tech., Zurich, pp. 1-16 (1997)
	DM	Yokosaki, et al., "Differential Effects of the Integrins a9B1, avB3, and avB6 on Cell Proliferative Responses to Tenascin", J. of Biol. Chem., Vol. 271, pp. 24144-50 (1996)
AG	DN	Yokosaki, et al., "Identification of the Ligand Binding Site for the Integrin a9B1 in the Third Fibronectin Type III Repeat of Tenascin-C", J. of Biol. Chem., Vol. 273, pp. 11423-28 (1998)

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AG	DA	Neidhardt, et al. "Tenascin-N: Characterization of a Novel Member of the Tenascin Family that Mediates Neurite Repulsion from Hippocampal Explants", Mol. and Cell. Neuro., Vol. 23, pp. 193-209 (2003)*
AG	DB	Neidhardt, et al. "Mus Musculus Tenascin-N (tnn) mRNA", Database EMBL Online, Database Accession No. AF455756 (2002) *
AG	DC	Adachi, et al., "Mus Musculus 16 Days Embryo Head cDNA", Database EMBL online, Database Accession No. AK048033 (2002) *
AG	DD	Philipp, et al., "Zebrafish Tenascin-W, a New Member of the Tenascin Family", J. of Neurobiology, Vol. 35, pp. 1-16 (1998) *
	~~DE~~	
AG	DF	Mackie, et al., "Induction of Tenascin In Wound Healing", J. Cell. Biol., Vol. 107, pp. 2757-67 (1988) [TO BE PROVIDED]
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	DH	
	DI	
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	DK	
	DL	
	DM	
	DN	

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Sheet 5

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AG	DA	Hauptmann, et al. "Extracellular Matrix Proteins in Colorectal Carcinomas", Lab. Invest., Vol. 73 (1995)
	DB	Jones, et al., "The Tenascin Family of ECM Glycoproteins: Structure, Function, and Regulation During Embryonic Development and Tissue Remodeling", Dev. Dynamics, Vol. 218 (2000)
	DC	Norderhaug, et al., "Versatile Vectors for Transient and Stable Expression of Recombinant Antibody Molecules in Mammalian Cells", J. of Imm. Meth., Vol. 204 (1997)
	DD	Pesheva, et al., "Tenascin-R as a Regulator of CNS Glial Cell Function", Prog. in Brain Res., Vol. 132 (2001)
	DE	Raouf, et al., "Discovery of Osteoblast-associated Genes Using cDNA Microarrays", Bone, Vol. 30 (2002)
	DF	Riva, et al, "Loco-regional Radioimmunotherapy of High-grade Malignant Gliomas Using Specific Monoclonal Antibodies Labeled with 90Y: A Phase I Study", Clin. Can. Res., Vol. 5 (1999)
	DG	Riva, et al., "131I Radioconjugated Antibodies for the Locoregional Radioimmunotherapy of High-grade Malignant Glioma", Acta Onc., Vol. 38 (1999)
	DH	Ruoslahti, "Fibronectin and Its Integrin Receptors in Cancer", Advances in Cancer Res. (1999)
	DI	Schenk, et al., "Tenascin-C in Serum: A Questionable Tumor Marker", Int. J. Cancer, Vol. 61 (1995)
AG	DJ	Zalutsky, et al., "High-level Production of a-Particle-Emitting 211 At and Preparation of 211 At-Labeled Antibodies for Clinical Use", J. of Nuc. Med., Vol. 42 (2001)
	DK	
	DL	
	DM	
	DN	

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be discovered, in one instance as a myotendinous antigen (Chiquet, M. & Fambrough, DM. (1984) J Cell Biol 98(6):1937-1946) and in another, as a protein enriched in the stroma of gliomas (Bourdon, MA. et al (1983) Cancer Res 43(6):2796-2805, reflecting the major sites of tenascin-C expression, namely in tendons and ligaments and the extracellular matrix of tumor stroma. A further instance of the discovery of tenascin-C (also termed hexabrachion) reflects its interaction with fibronectin (Erickson, HP. et al. (1984) Nature 311(5983):267-9). Enforced interaction of tumour cells with fibronectin can block proliferation in cell culture and can decrease tumour growth in nude mice (Akamatsu H. et al (1996) Cancer Res 56: 4541-4546 and Giancotti, F. G & Ruoslahti, E. (1990) Cell 60: 849-859). Tenascin-C was shown to disrupt the interaction of cells with fibronectin and in this manner may enhance tumour cell proliferation. Chiquet-Ehrismann, R. et al (1988) Cell 53: 383-390 were the first to show that tenascin-C binds to fibronectin, blocks cell attachment to fibronectin and increases proliferation of rat breast adenocarcinoma cells (Chiquet-Ehrismann, R. et al ([illegible]) Cell [illegible]: 131-139).

Tenascin-C is present in a large number of develo[illegible] including the nervous system. Although abundant in mature ligaments and tendons, it is absent from skeletal and heart muscle, unless the muscle has been injured. Tenascin-C expression is elevated in essentially all carcinomas as well as in many other types of tumors (for review see Chiquet-Ehrismann, R. (1993) Semin Cancer Biol 4(5):301-10). Furthermore, tenascin-C is upregulated in wound healing (Latijnhouwers, MA. et al. (1996) J Pathol 178(1):30-5), during skeletogenesis (Koyama, E. et al (1996) J Orthop Res. 14(3):403-412 and Hall, BK. & Miyake, T. (1995) Int J Dev Biol. 39(6):881-893) as well as in many diseases involving infections and inflammation (Schenk, S. et al. (1995) Int J Cancer 61(4):443-9).

Each tenascin family member exhibits a specific gene expression pattern during embryogenesis and in the adult (for review see Chiquet-Ehrismann, R. (1995) Experientia 51(9-10):853-62) suggesting specific roles for each member. Tenascin-R is an extracellular matrix component of the nervous system found mainly in brain tissue (Pasheva, P. et al. (2001) Prog Brain Res.

132:103-14. Review), whereas tenascin-X is prominently expressed in muscle and skin connective tissue. In one patient, tenascin-X deficiency has been reported to result in an Ehler's Danlos phenotype (Burch, GH. et al. (1997) Nat Genet 17(1):104-8).

To date there is only one report on tenascin-W available in the literature. (Weber, P. et al. (1998) J Neurobiol 35(1):1-16). In this study, a cDNA encoding tenascin-W was isolated from a 20-28h postfertilization zebrafish cDNA library on the basis of the conserved epidermal growth factor-like domains found in all tenascin molecules. The expression pattern of tenascin-W transcripts was studied in the developing zebrafish by in situ hybridisation. It was found to be present in neural crest and sclerotome cells and the developing skeleton. Genebank sequence AJ001423 provides a zebrafish tenascin-W, and AL049689 provides a "novel human mRNA from chromosome 1, similar to Tenascin-R", whose function is not known.

The present invention provides a composition comprising an isolated nucleic acid molecule having a nucleotide sequence selected from the group consisting of:

(a) a nucleotide sequence as set forth in SEQ ID NO: 1;

(b) a nucleotide sequence encoding the amino acid sequence shown in SEQ ID NO: 2;

(c) a nucleotide sequence with at least 85% identity to the sequence of (a) or (b);

(d) a subsequence of more than 50 consecutive nucleotides of a sequence of (a), (b) or (c); and

(e) a nucleotide sequence complementary to any of the nucleotide sequences or subsequence in (a),(b), (c) or (d).

In one aspect of the invention, the isolated nucleic acid molecule having a nucleotide sequence preferably exhibits at least 85% identity to the sequence of (a), more preferably encoding a variant of the amino acid sequence shown in SEQ ID NO: 2, such as a variant comprising an amino acid deletion, addition (e.g. fusion proteins) or substitution of the amino acid sequence